CMOS Output Programmable SMD Crystal Clock Oscillator

AP2S series

Request Samples | Check Inventory | ESD Sensitive

2.5 x 2.0 x 1.0 mm
RoHS/RoHS II Compliant
MSL Level = N/A

Features

- Performance comparable to fixed frequency oscillator
- Short lead time, Suitable for mass production
- CMOS output waveform, Tri-state output function
- 1.8V, 2.5V and 3.3V Supply Voltage Options
- Hermetically seam-sealed ceramic package

Applications

- Industrial control and automation
- Portable and wearable electronics
- Internet of Things (IoT)
- Consumer electronics
- Networking

Key Electrical Specifications

Parameters		Min.	Typ.	Max.	Units	Notes
Frequency Range	V_{dd} = 3.3V	1		200	MHz	
	V_{dd} = 2.5V	1		200		
	V_{dd} = 1.8V	1		125		
Operating Temperature		-10		+60	°C	See options
Storage Temperature		-50		+125	°C	Storage Temperature
Overall Frequency Stability*		-100		+100	ppm	See options
Supply Voltage (V_{dd})	V_{dd} = 3.3V	3.135	3.30	3.465	V	Standard
	V_{dd} = 2.5V	2.375	2.50	2.625		V_{dd} option 1
	V_{dd} = 1.8V	1.71	1.80	1.89		V_{dd} option 2
Input Current	V_{dd} = 3.3V			40	mA	
	V_{dd} = 2.5V			35		
	V_{dd} = 1.8V			30		
Symmetry**		45	50	55	%	@ 1/2Vdd
Rise and Fall Time (Tr/Tf)***	V_{dd} = 3.3V			4	ns	
	V_{dd} = 2.5V			5		
	V_{dd} = 1.8V			6		
Output Load				15	pF	CMOS
Output Voltage	V_{OL}			0.4	V	
	V_{OH}	Vdd - 0.4				
Start-up Time				8	ms	
Tri- state function		"1" (V_{IH} > 0.7* Vdd) or Open: Oscillation "0" (V_{IH} < 0.3* Vdd): No Oscillation (High Impedance)				
Standby current (Power Down option)			<400		uA	V_{dd} = 1.8, 2.5, 3.3V

ABRACON

5101 Hidden Creek Ln Spicewood TX 78669
Phone: 512-371-6159 | Fax: 512-351-8858
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Parameters	Min.	Typ.	Max.	Units	Notes
RMS Phase Jitter**** @25°C± 3°C (10 - 39MHz: 12kHz to 5MHz) (>39MHz: 12kHz to 20MHz)		1	2	ps	V_{dd}=3.3V
		1.1	2	ps	V_{dd}=2.5V
		1.5	2.2	ps	V_{dd}=1.8V
Aging:	-3.0		+3.0	ppm	@+25°C First year

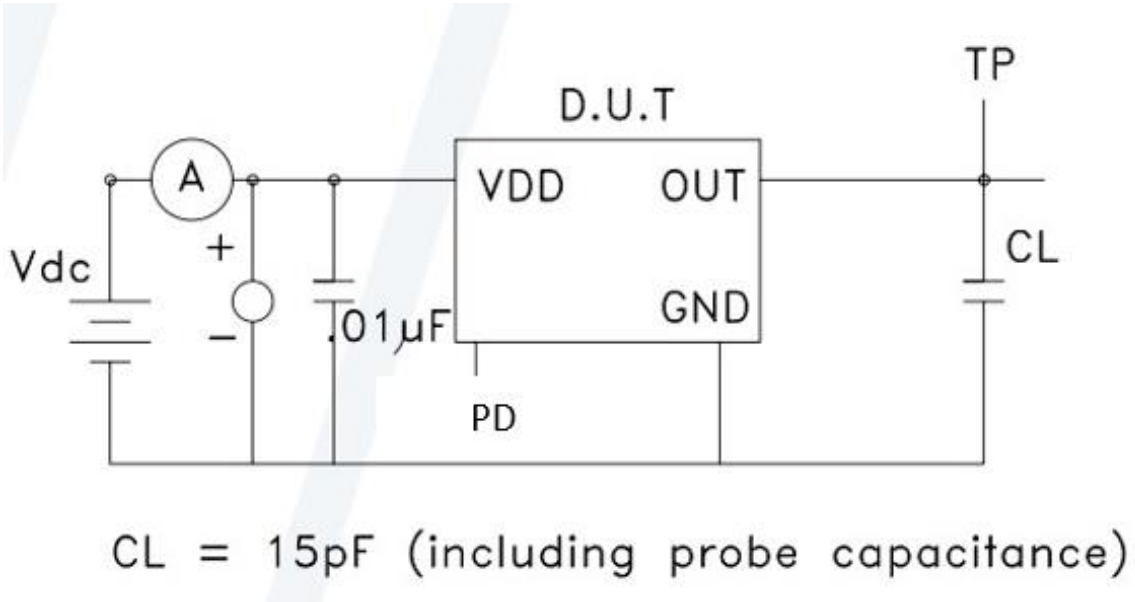
* Inclusive of calibration tolerance @25°C, operating temperature range, input voltage variation, load variation, and first year aging. For ±20ppm Overall Frequency Stability: Inclusive of calibration tolerance @25°C, operating temperature range, and load variation.

** Only 40/60% is available for certain frequencies. Please contact Abracon when ordering.

*** Transition times are measured between 10% and 90% of Vdd with an output load of 15 pF.

**** Frequency dependent, contact factory.

Test Circuit



CL = 15pF (including probe capacitance)

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Opting and part Identification (left blank if standard)

AP2S□ - □ MHz - □□□ - □

Supply Voltage	Frequency in MHz	Operating Temp.	Overall Freq. Stability	Tri- state pin	Packaging
Blank: 3.3V(*)	Please specify the frequency in MHz. e.g. 14.31818MHz	Blank: -10°C ~ +60°C	J: ±20ppm (***)	B: Power Down (**)	Blank: Bulk
1: 2.5V		I: 0°C ~ +50°C	R: ±25ppm		T: Tape & Reel (1k/reel)
2: 1.8V		E: -20°C ~ +70°C	K: ±30ppm		T3: Tape & Reel (3k/reel)
		F: -30°C ~ +70°C	C: ±50ppm		
		N: -30°C ~ +85°C			
		L: -40°C ~ +85°C			

* 3.3V is standard

** PDB: Tri- state the output buffer and shut off the oscillator.

*** Contact ABRACON for availability

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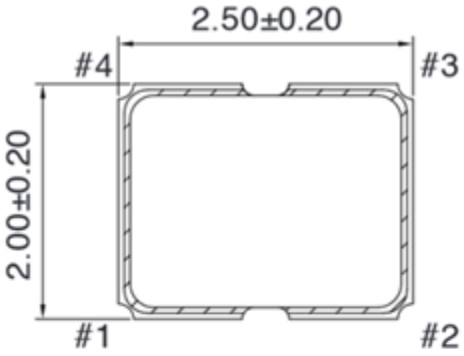
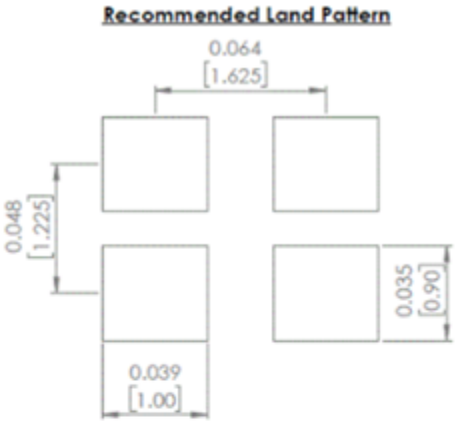
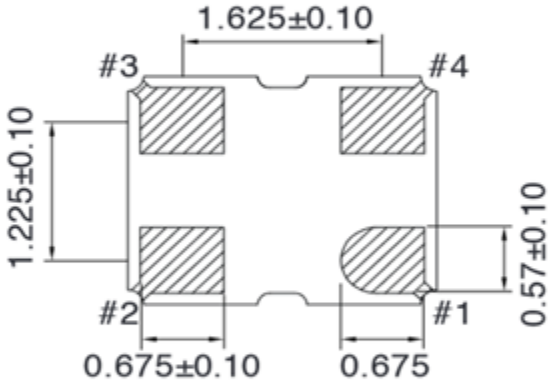
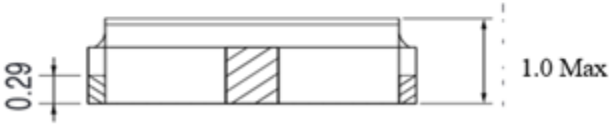
Mechanical Dimensions







Pin	Function
1	Tri-State
2	GND/Case
3	Output
4	Vdd



Note 1

Do not leave Pin 1 (Tri-State) floating
If Pin 1 (Tri-State) is not utilized for toggling, it must be tied to Vdd (logic 1).

Note 2

Recommend using an approximately 0.01uF
bypass capacitor between PIN 2 and 4.

Dimensions: inches (mm)

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Reflow Profile

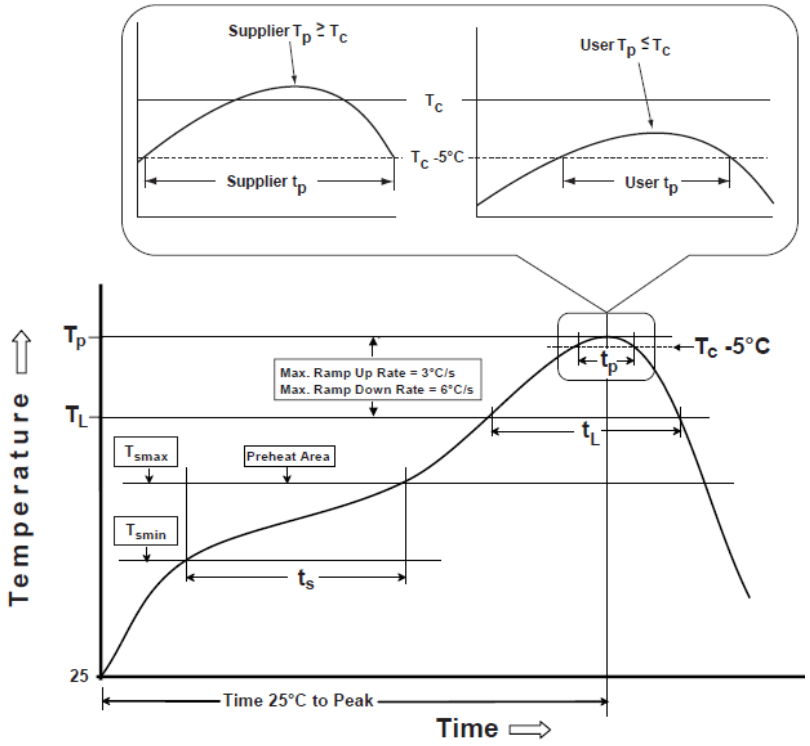

Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	Volume mm³ <350	Volume mm³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2

Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	Volume mm³ <350	Volume mm³ 350-2000	Volume mm³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T_{smax} to T_P)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	217°C
Time at liquidous (t_L)	60 - 150 sec.	60 - 150 sec.
Peak package body temperature (T_P)*	**see Table 1**	**see Table 2**
Time (t_p)** within 5°C of the specified classification temperature (T_C)	20 sec.	30 sec.
Ramp-down rate (T_p to T_{smax})	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t_p) is defined as supplier minimum and a user maximum.

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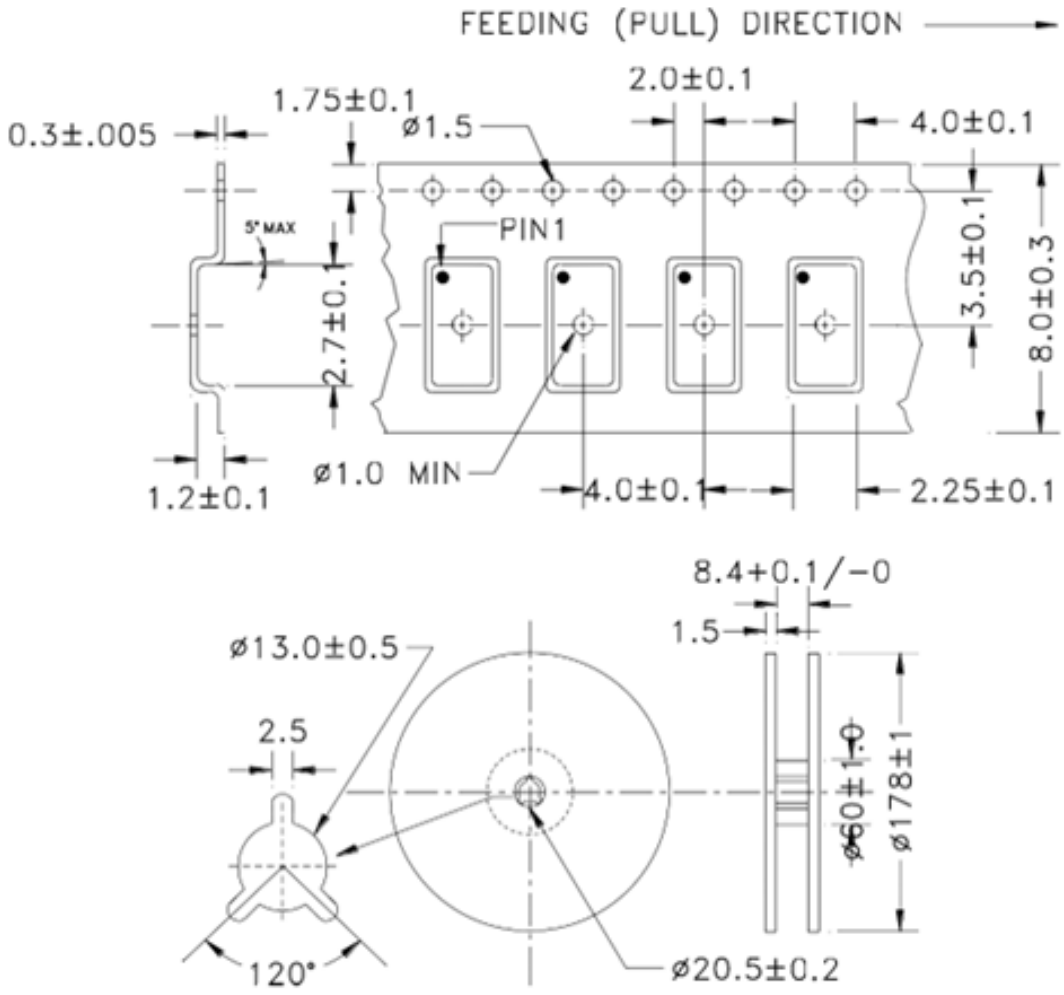
Packing

T= Tape and reel (1,000pcs/reel)
T3= Tape and reel (3,000pcs/reel)



Dimensions: mm

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